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ON A NEW SPECIES OF ROTIFER, OF THE GENUS APSILUS.

BY SARA GWENDOLEN FOULKE.

Among *Spirogyra* and *Anacharis*, gathered in Fairmount Park, were noticed numbers of large rotifers, attached to filaments and leaves of the plants. Though resembling in some respects the forms, *Dictyophora*, of Leidy; *Apsilus*, of Meczinchow, and *Cupelopagus*, of Forbes, this rotifer still possesses sufficiently striking differences to warrant its being regarded as a distinct species. The size of the specimens examined varied greatly, the maximum size being one-fiftieth of an inch, from the top of the extended net to the end of the body.

The ventral outline of the body is ovoid ; the lateral outline is crescent-shaped ; while the dorsal outline is similar to the ventral. Instead of rotatory organs, this rotifer possesses a membraneous cup or net, near the base of which, on the ventral side, are two lateral antennæ, as in *Apsilus lentiformis.*

When the net is retracted, the antennæ are also withdrawn into the body, and concealed from view. This is an unusual habit among the Rotatoria, the antennæ being usually situated upon the body, and remaining exposed so as to act as sentinels when the rotatory organs are retracted. This net is used for the capture of food, consisting of the larger infusoria closing over any organism which is attracted into it. After capture, the food passes through the oral aperture into a large, sac-like passage-way, and thence into a second pouch, which extends across the body in the form of a much-wrinkled bag. The two ends of this bag widen into sacculated pouches, which are used as storehouses for the food while softening. This organ may be regarded as the stomach proper, being filled with a greenish granular fluid, which performs the office of a true gastric juice, softening the tissues of the contained food, in preparation for the action of the mastax. When this maceration has been sufficiently prolonged, the food is forced, by muscular contraction, out of its recess, along the narrow central portion, past the mastax and into the opposite pouch. As the stream of food passes, the mastax, which is situated centrally at the bottom of the stomach, turns, so as to face the stream of mingled food and gastric fluid ; and works actively, chopping and bruising such portions as come within reach. The mastax exactly resembles that of the three other known species, being composed of two curved major unci, near the base of each of which are situated four minor unci. After being acted upon by the mastax, the food passes between the unci into the œsophagus whence it is absorbed or thrown off by the system. The ventral view of these organs is usually obscured by large numbers of embryo, in various stages of development. In front of the digestive sac, and apparently connected with it, are two curved, pear-shaped sacs, of a transparent greenish hue.

This rotifer, in common with all members of its genus, has an unarticulated body, which is incapable of contraction.

The net, which takes the place of rotatory organs, is shaped like a hood, the ventral portion being elevated into an obtuse lobe. In order to strengthen and support the long, curved, dorsal outline of the net, there is, covering about two-thirds of it, a membraneous shield, made doubly strong by two wide, arched, muscular bands running around it. At the base of this shield is a pointed projection, which is of still firmer composition. The necessity for such an arrangement is obvious, when it is remembered that the normal position of the animal is a semi-recumbent one; so that the weight of the net, which is about three-quarters the area of the body, would be very considerable at these carefully strengthened points.

The whole muscular system of this species is strongly marked and powerful. Focussing downwards from the outside of the dorsal view of the net, two gradually narrowing ridges or flaps are seen extending up the inside of the hood. These flaps are fringed with quite long cilia, and there are also shorter diagonal lines of more minute cilia, the exact number of which lines could not be accurately determined. This is the first instance in which cilia have been discovered in any member of the genus, all those species previously described, being stated to be *totally destitute* of these organs. In this case, their presence was first detected while focussing through the dorsal side of the net, although they could afterwards be plainly seen in a ventral view. It was only by careful placing of the mirror that the cilia were visible.

Attached to the inside walls of the rotifer were the enigmatical transparent bodies common in the Rotatoria; and also a number of purplish brown bodies, varying in intensity of tint, whose character is as yet unknown.

The rotifer, in the adult state, is tailless, eyeless, and attached in a semi-recumbent position, from which it is incapable of detaching itself, and without the power of re-attaching itself when displaced.

In the young state it has two red eye-spots; a clumsy telescopic tail, terminating in a broad, cup-shaped sucker; and is so actively free swimming that no accurate drawing could be obtained. In this undeveloped state the rudimentary net is a thick fleshy triangle, the truncated apex of which is inserted into the body, while the base is surrounded by a wreath of cilia, on the closed space within which the eye-spots are set. There is in this stage no opening to admit nourishment.

The development of this form into that of the very dissimilar adult state is most interesting, and well worth the time and patience necessary to observe it.

It is proposed to unite the three forms, *Dictyophora vorax*, *Apsilus lentiformis*, *Cupelopagus bucinedax*, and the form described above, in one genus under the name *Apsilus*. The name *Dictyophora* would have the first claim for adoption, but it is already in use in two other branches of science, so that the choice must fall upon the next in order of priority. The specific names given to the forms by their discoverers are retained. The history of the genus is as follows: In 1857, Dr. Jos. Leidy discovered and described a form which he named *Dictyophora vorax*. In 1866, Meczinchow described and named a similar form which he named *Apsilus lentiformis*, the differences from *Dictyophora* being as follows: shape of the cup; presence of two lateral antennæ; and presence of a conspicuous ganglion of the pouch.

In 1882, S. A. Forbes described a form which he named *Cupelopagus bucinedax*, designating it as a new genus. The differences between this and the two forms previously described are as follows: *Cupelopagus* differs from *Dictyophora* in the shape of the net, and in the general shape of the body, the difference in these particulars being very marked. It differs from *Apsilus* in the absence of the ganglion of the pouch, in the absence of the lateral antennæ, and in other minor particulars.

The species described by the author varies from the foregoing in the following respects: it differs from *Dictyophora* in the shape of the cup, as well as that of the body; in the presence of two lateral antennæ; in the possession of a second crop or stomach situated below the ordinary crop; in the marked muscular system, and in the ciliation of the net.

The points of dissimilarity between this form and *Apsilus* are as follows: The shape of the cup; the absence of the ganglion; the presence of a second stomach, and in the ciliation of the cup. It differs from *Cupelopagus*: in the shape of the cup; in the construction of the cup; in the two lateral antennæ; in the presence of a secondary stomach; and in the ciliation of the net.

The presence of the secondary stomach distinguishes this species from the rest of the genus. The presence of cilia is not so certain a distinction, as by dexterous management of illumination their presence might possibly be detected in some other of the species.

From the presence of the secondary stomach or pouch, it is proposed to name this new species *Apsilus bipera—pera* meaning "a little pouch to carry food."

The reasons for uniting the three forms heretofore considered separate genera, are, of course, founded on the strong points of resemblance; these being, briefly, the presence of two eye-spots, of a membraneous cup, of a mastax exactly similar in all four forms, of the absence of tail or footstalk, of the absence of carapace, and of the similar habits.

The characteristics heretofore used in the classification of the Rotatoria, as denoting members of the same genus, are: character of rotatory organs; number of eye-spots; absence or presence of carapace, and habits.

In selecting the name for this new division, *Dictyophora*, of Leidy, has the right of priority, but, owing to its having been already many years in use, in two other branches of science, the choice must fall upon that next in order of priority, which is *Apsilus*, of Meczinchow.

The genus *Apsilus*, then, will consist of four species—*Apsilus vorax* Leidy; *Apsilus lentiformis* Meczinchow; *Apsilus bucinedax* Forbes; and *Apsilus bipera* Foulke.

As there is no family in the class Rotatoria, in which the above genus may be placed, a new family, to be named *Apsilidæ*, is proposed; characteristic, the substitution of a membraneous cup or net, destitute of external ciliation, in the place of the ordinary rotatory organs.

Bibliog.—Leidy, *Proc. Acad. Nat. Sci.*, 1857, 204; Meczinchow, *Zeits. f. wis. Zoologie*, 1866, 346, *Taf. XIX;* Forbes, *Am. Month. Micros. Jour.*, 1882, 102, 151.

REFERENCES TO PLATE I.

FIG. 1. *Apsilus vorax* (*Dictyophora vorax* of Leidy). *a*. Membraneous net. *b*. Crop. *c, c*. Embryo. *d*. Mastax. *e*. Œsophagus. *f*. Oral aperture. *g*. Vent. *h*. Muscular system of net. *Reduced from drawing by Leidy. The body is slightly wider in proportion to the net than in original drawing.*

FIG. 2. *Apsilus lentiformis* Meczinchow. *a, a*. Antennæ. *b*. Muscular system of net. *c*. Crop. *d*. Mastax. *e, e*. Embryo. *f*. Œsophagus. *g*. Purplish brown bodies. *Reduced from drawing by Meczinchow.*

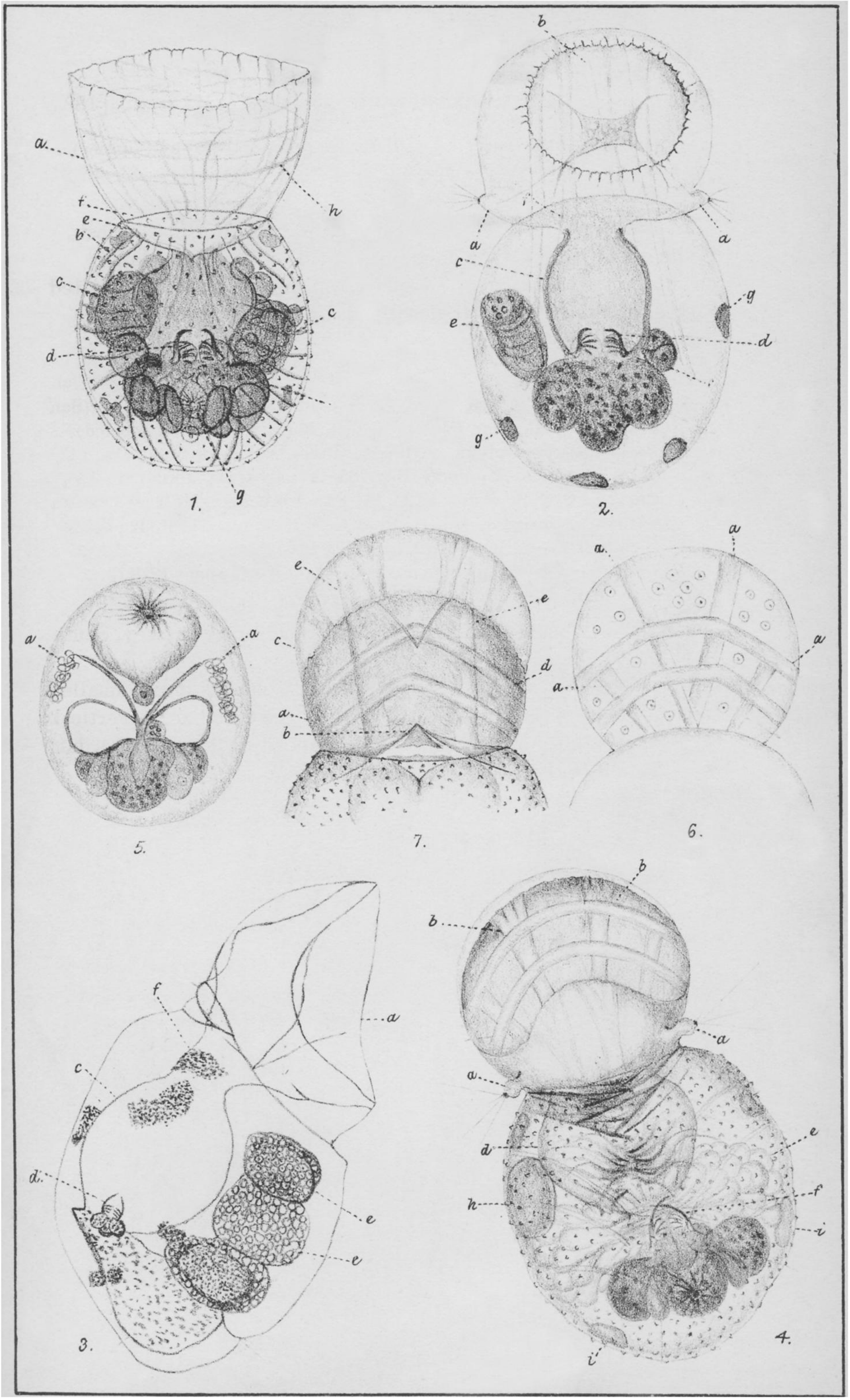
FIG. 3. *Apsilus bucinedax* (*Cupelopagus bucinedax* of Forbes). *a*. Net. *b*. Oral aperture. *c*. Crop. *d*. Mastax. *e, e*. Embryo. *f*. Œsophagus. *Reduced from drawing by Forbes.*

FIG. 4. *Apsilus bipera* Foulke. *a, a*. Antennæ. *b*. Muscular system of net. *c*. Oral aperture. *d*. Crop. *e*. Secondary sacculated stomach. *f*. Mastax. *g*. Œsophagus. *h, h*. Embryo. *i*. Enigmatical purplish brown bodies attached to walls of body.

FIG. 5. *Apsilus lentiformis* Meczinchow. *a, a*. Ganglion of the pouch. Superficial view when closed.

FIG. 6. Dorsal view of net of *Apsilus lentiformis*. *a, a, a, a*. Muscular system.

FIG. 7. Dorsal view of net of *Apsilus bipera*. *a*. Shield. *b*. Pointed support. *c*. Portion of net above shield. *d*. Muscular system of shield. *e*. Ciliated flaps extending up inside of net.



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GENUS APSILUS.